

**SECTION 15501**  
**GENERAL PROVISIONS FOR HEATING, VENTILATING AND**  
**AIR CONDITIONING WORK**

**PART 1 - GENERAL**

**1.01 SCOPE OF WORK**

- A. Provide labor, materials, tools, machinery, equipment, and services necessary to complete the HVAC Work under this Contract. All systems and equipment shall be complete in every aspect and all items of material, equipment and labor shall be provided for a fully operational system and ready for use. Coordinate the work with the work of the other trades in order to resolve all conflicts without impeding the job progress.
- B. Examine the Architectural, Structural, Plumbing and Electrical Drawings and other Divisions, and Sections of the Specifications in order to determine the extent of the Work required to be completed under this Division. Failure to examine all the Contract Documents for this Project will not relieve the Contractor of his/her responsibilities to perform the Work required for a complete fully operational and satisfactory installation.
- C. The Work includes but is not limited to the following systems, equipment and services:
  - 1. Remove existing AC unit on Auditorium roof. Store and protect throughout Architectural work and reinstall on new 24" curb. Provide temporary cooling as required for MDF Room. Provide testing prior to removal and after reinstallation per spec section 15992. Evacuate refrigerant per EPA guidelines and recharge per manufacturers' instructions.
  - 2. Protect all other mechanical vents and equipment in place throughout roofing work.
- D. Start-up services shall be included in the bid.
- E. All systems, equipment and services specified herein shall be provided complete and ready for use.
- F. General Contractor and Mechanical Contractor are to facilitate the coordination of the DDC control features provided by all trades, vendors, and equipment

manufacturers and the TCC for a complete seamlessly integrated system of operation. Before submitting any equipment shop drawings for approval, the HVAC Contractor, Automatic Temperature Controls Contractor and the Equipment Vendor and Manufacturer shall coordinate the controls required for the system.

- G. During construction, the HVAC Contractor shall comply with the indoor air quality (IAQ) requirements indicated in Contract Specification Section S01550.

### 1.02 RELATED WORK

- A. Division 1 General Requirements
- B. Division 2 to 9 Structural Sections
- C. Division 16 Electrical Sections

### 1.03 SUBMITTALS

- A. General: Unless indicated otherwise in the specific technical section, if a particular product specified in the technical section is being provided, manufacturer's qualifications and samples (except as listed below), are not required to be submitted. Manufacturer's product data, installation instructions, samples requiring color or texture approval, samples showing thickness and type of material, shop drawings, and calculations are to be submitted. Schedules, startup manuals, operation and maintenance manuals, and shop drawings are always required to be submitted.
- B. The following Submittals are required for all Sections of Division 15-Heating, Ventilating, and Air Conditioning. Specific "Supplemental Submittals" or additional information to that listed below that are required to be submitted are defined in each individual technical section.
  - 1. Product Data: Submit manufacturer's product data for equipment including catalog sheets or cuts, specifications, capacity, performance charts, test data, materials, dimensions, weights, furnished specialties and accessories; and installation instructions. Submit start-up instructions where applicable.

2. Shop Drawings: Submit manufacturer's shop drawings detailing equipment assemblies and indicating dimensions, weight, loadings, required clearances, method of field assembly, components, location and size of each field connection.
- C. Where indicated in the Supplemental Submittals of the technical sections, the following submittals are defined as follows:
1. Maintenance Data: Submit maintenance data and parts list. Include this data and the product data in the maintenance manual in accordance with the requirements of Division 1.
  2. Test Report: Submit factory certified test results prior to shipping.
  3. Certificates: Submit written affidavit stating that the Contractor has started up and demonstrated (in the presence of the Authority's Representative and required Department of Education personnel, including DOE Maintenance Representative) that the equipment is operating properly as designed.
- D. Piping Diagrams: Submit a complete piping layout of all equipment. All parts of the installation shall be indicated exactly as installed and shall be properly identified. Valve identification numbers shall agree with valve tags of Section 15502: HVAC Identification and all piping shall be clearly shown and labeled.
- E. Coordination Drawings: Provide complete coordination Drawings showing interface of all mechanical trades with the Architecture of the Building. All copies are to be signed. The Contractor is to keep a copy of the signed coordination drawing on the site.
- F. Miscellaneous Submittals
1. HVAC Painting Schedule: Provide a complete schedule of all items to be painted.

**1.04 QUALITY ASSURANCE**

- A. **Manufacturer's Qualifications:** If a particular product specified in the technical section is not being provided, provide manufacturer's qualifications.

Provide manufacturer's qualifications that indicate that the firms are regularly engaged in manufacture of equipment, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than five years.

- B. **Codes and Standards:** All equipment furnished and installed shall meet or exceed the referenced Standards and Codes in all respects - installation, performance, etc.

References and industry standards listed herein and in other HVAC Sections are applicable to the Work specified in the Section. Unless more restrictive criteria is explicitly called-out for in other HVAC Specifications or mandated by the NYC Construction Codes, the requirements described in the referenced standards below shall be deemed applicable to the Work. This includes language in the documents in the form of a recommendation or suggestion, which shall be deemed as mandatory.

1. NFPA
2. 2014 NYC Construction Codes (including Building Code BC, Mechanical Code MC and Fuel Gas Code FGC)
3. ASHRAE
4. SMACNA
5. ELECTRICAL IEEE STANDARDS
6. STATE DEC REGULATIONS
7. NYCDEP DEPARTMENT OF AIR RESOURCES CRITERIA
8. ASME
9. ANSI
10. NY INDUSTRIAL CODE RULE 4
11. ABMA
12. UL
13. LOCAL LAWS
14. NCPWB
15. FCI
16. EJMA
17. MSS
18. ABMA
19. IRI
20. OTCR NYC Office of Technical Certification and Research
21. AABC

22. NEBB
23. ARI
24. AMCA
25. ADC
26. NEMA
27. NEC
28. ASTM
29. FCI
30. USGB LEED Green Building Rating System
31. 2016 NYC Energy Conservation Code (NYCECC)
32. ASHRAE 90.1-2013 as modified by Appendix CA of the 2016 NYCECC

All appliances regulated by the New York City Construction Codes shall be listed and labeled (reference Sections MC 301.4 & MC 301.6 of the 2014 NYC Mechanical Code). Testing of material shall be in accordance with §28-113 of the NYC Administrative Code (reference Section MC 301.5). Whenever the NYC Construction Codes or the Rules of the Department of Buildings requires that material be listed or labeled and material proposed to be used is not so listed or labeled, the use of such material shall be subject to prior approval by the Commissioner (Office of Technical Certification and Research OTCR) and such material shall be used only to the extent set forth in such approval. Materials that were previously approved by the Board of Standards and Appeal (BSA) or by the Department (MEA) before the effective date of the NYC Construction Codes may continue to be used, but only to the extent set forth in such approval, and only if such approval is not specifically amended or repealed by the Commissioner.

#### **1.05 ACCESSIBILITY**

- A. Install access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.
- C. For access doors to valves, dampers and all other HVAC type of items, accessories and equipment, concealed in walls, furrings and hung ceilings; Refer to Section 08305. Door shall permit full access to the equipment.
- D. Per Section MC 304.13, equipment and appliances installed on rooftops of buildings shall be installed in accordance with the requirements of the Section FC 504.4 of the 2014

New York City Fire Code regarding rooftop access and obstructions, and shall not obstruct or interfere with firefighting operations or the operation of any doors, windows, fire escapes, or other means of egress or other building components requiring operation or access. Layout and coordinate equipment and piping in a manner that will not affect the required access.

**1.06 ROUGHING-IN**

- A. Verify final locations for roughing work with field measurements and with the requirements of the actual equipment being connected. Coordinate with General Construction drawings.

**1.07 MECHANICAL INSTALLATIONS**

- A. Coordinate HVAC equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components to allow for HVAC installations.
- D. Sequence, coordinate, and integrate installations of HVAC materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning and entrance prior to the close of the building.
- E. Coordinate the cutting and patching of building components to accommodate the installation of HVAC equipment and materials.
- F. Install HVAC equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting and minimum of interference with other installations.
- G. Provide all rigging, disassembly and reassembly of equipment including the furnishing and installation of dunnage and all other required and necessary accessories. Supports for ductwork/pipes/etc. supported by the roof deck shall utilize manufactured supports or pipes that will permit effective roofing. Use of irregular shaped units such as strut channels is not permitted.

- H. For purposes of clearness and legibility, HVAC Drawings are essentially diagrammatic and size and location of equipment are drawn to scale wherever possible. The Drawings indicate size, connection points and routes of ductwork and pipe. It is not intended, however, that all offsets, rises and drops are shown. Provide ductwork and piping as required to fit structure, avoid obstruction, and retain clearances, headroom openings and passageways. Piping/ductwork installed over any means of egress and access passageways must be 7'-6" clear inclusive of insulation.
1. Piping/ductwork at equipment must be done in a manner such that access around equipment is not impeded, such as at equipment platforms.

### **1.08 CUTTING AND PATCHING**

- A. Do not endanger or damage installed Work through procedures and processes of cutting and patching.
- B. Arrange for repairs required to restore the work, because of damage caused as a result of HVAC installations.
- C. No additional compensation will be authorized for cutting and patching Work that is necessitated by defective or non-conforming installations.
- D. Perform cutting, fitting, and patching of HVAC equipment and materials required to:
1. Remove and replace defective work.
  2. Remove and replace work not conforming to requirements of the Contract Documents.
  3. Remove samples of installed work as specified for testing.
  4. Install equipment and materials in existing structures.
  5. Cut, remove and legally dispose of selected HVAC equipment, components, and materials as indicated, including, but not limited to removal of HVAC piping, heating units and trim and other HVAC items made obsolete by the new work.

6. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

E. Locate identify, and protect HVAC services passing through remodeling or demolition area and serving other areas required to be maintained operational. When transit services must be interrupted, provide temporary services for the affected areas.

#### **1.09 MATERIALS**

A. Refer to Section G01600 for requirements. The following paragraph supplements this Section.

In addition, since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements are the minimum standards acceptable.

#### **1.10 DELIVERY, STORAGE, AND HANDLING**

A. Handle equipment carefully to prevent damage, breaking, denting, and scoring. Do not install damaged units or components; replace with new.

B. Store equipment in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

E. Comply with manufacturer's rigging and installation instructions for unloading equipment, and moving them to final location.

#### **1.11 RECORD DOCUMENTS**

A. Refer to the Section G01700 and Section G01720 for requirements. The following paragraph supplements the requirements of those Sections:

Mark Drawings to indicate revisions and date of revisions. Mark Specifications to indicate approved substitutions; Change Orders; actual equipment and materials used.

#### **1.12 GUARANTEES, WARRANTIES, BONDS, AND MAINTENANCE CONTROL**



- A. Refer to Section G01740 for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.
1. Compile and assemble the warranties specified for HVAC work into a separated set of documents, tabulated and indexed for easy reference.
  2. Provide complete warranty information for each item to include product or equipment including duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.
  3. Unless otherwise noted in the specific sections, warranties for the equipment, workmanship and materials shall be provided for the period of one year. Exceptions include, but are not limited to, the five-(5) year warranty provided for the refrigeration compressors.
  4. Manufacturers', not Contractors' warranties, shall be provided for all HVAC equipment and accessories.
  5. All warranties are to start from the date of Substantial Completion.

### **1.13 OPERATIONS, TRAINING, AND MANUAL**

- A. Refer to Section G01730 for procedures and requirements for preparation and submittal of operation and maintenance manuals of each HVAC equipment. Refer to individual equipment specifications for maintenance manual additional requirements. In addition, include the following information:
1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
  2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shut-down, and emergency instructions; and summer and winter operating instructions.

3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassemble; aligning and adjusting instructions.
  4. Servicing instructions and lubrication charts and schedules.
- B. Bind all the other Sections maintenance manuals in a single final Operating and Maintenance Manual with the requirements of Section G1730.
- C. Refer to Section S01650 for procedures and requirements for training on each HVAC equipment. Refer to individual equipment specifications for the additional training requirements.

#### 1.14 PAINTING

- A. Paints and coatings used in the interior of the building to cover insulation for identification purposes shall not:
1. Exceed the VOC content limits established in the Green Seal Standard GS-11 Paints, First Edition, May 20, 1993.
- B. Paints and coatings used in the interior of buildings to mark piping for identification purposes shall not:
1. Exceed the VOC content limits established in the Green Seal Standard GS-11 Paints, First Edition, May 20, 1993.
  2. Exceed the VOC content limit of 250 g/l established in the Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997.
- C. All adhesives and sealants shall comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168; VOC limits shall comply with the limits indicated in LEED Version 3.0, Indoor Environmental Quality Credit IEQ 4.1. Those limits correspond to an effective date of the SCAQMD Rule #1168 of July 1, 2005 and Rule Amendment date of January 7, 2005.
- D. Refer to Section 09900: Painting for materials and method of application and follow all the requirements specified in the Section.

## E. Painting Schedule

1. No on-site painting is required on the following items unless specifically indicated otherwise:
  - a. Concealed metal and piping.
  - b. Chromium plated piping and chromium plated metal.
  - c. Stainless steel sheet metal.
  - d. Stainless steel piping.
  - e. Piping or ductwork to be insulated.
  - f. Insulation on piping or ductwork in unfinished spaces or concealed.
  - g. Insulated piping covered with stainless steel, aluminum, polyvinyl chloride, or all service jacketing, unless otherwise specified.
  - h. Mechanical equipment with a factory applied baked-on enamel finish, not specified to be insulated or provided with an enameled steel insulated jacket.
  - i. Insulated equipment noted on the Drawings to be covered with stainless steel or aluminum sheet metal jacketing or insulated cement finish.
  - j. Factory fabricated double wall insulated metal vents.
2. Paint the following:
  - a. Jacketing on Insulated Piping: exposed, in Finished Rooms or Finished Spaces: 2 coats of latex semi-gloss enamel. No primer required.
  - b. Flexible Foamed Plastic Insulation on Piping, Ductwork and Equipment:
    - 1) Exposed Exterior to a Building: 2 coats of Armstrong Armaflex Finish. No primer required.

- c. Uninsulated Mechanical Equipment: furnished with a factory applied prime coat finish: 2 coats of acrylic latex semi-gloss enamel. No primer required.
- d. Hangers, Supports, Restraints and Accessories:
  - 1) Exposed: Paint to match adjacent piping, pipe insulation or ductwork insulation.
  - 2) All black steel or iron pipe hangers, rods, inserts, brackets, restraints, and accessories for supporting piping systems and duct systems: 1 coat of primer and 2 coats of latex semi-gloss enamel. Paint black steel hanger rods, threaded on the job site, with a primer immediately after installation.

F. Color Coding:

- 1. Apply finish paints of colors indicated opposite the various items listed below where such items are installed in Mechanical Equipment Rooms, Machine Rooms, Boiler Rooms, Penthouse Mechanical Equipment Rooms:

Piping, Exposed - Bare and Insulated on Unfinished Spaces and Rooms:

Refrigerants Green

- 2. Equipment - Bare and Insulated (Except Factory Painted): Grey.

**1.15 ADJUSTING AND CLEANING**

- A. Refer to Section G01700 for general requirements for final cleaning.
- B. Alignment: Check alignment, and where necessary, realign equipment within recommended tolerances by the manufacturer and in presence of manufacturer's service representative and the Authority.

**1.16 TORCH BURNING OPERATION**

- A. The storing and use of oxygen and combustible gases in conjunction with torch burning apparatus is subject to the Rules and Regulations of the Division of Fire Prevention of the Fire Department of the City of New York, latest Fire Prevention (F.P.) Directive. Fire watches shall be provided during all operations using torches for burning, cutting or welding.
- B. Contractor shall apply for and obtain permits for the use and storage of such equipment on school premises. The operator of such equipment shall have a certificate of fitness issued by the Fire Department.
- C. The cost of permits, certificates, fire watches, apparatus and other items required in the torch burning operation shall be borne by the Contractor at no additional cost to the Authority.

**1.17 SPECIAL INSPECTIONS/TESTS**

- A. Refer to Section S01400 for requirements.
- B. The following Special Inspections are required by the NYC Building Code for the HVAC Trade:

<u>Item</u>	<u>Code Section</u>
Mechanical Systems	BC 1704.16

- C. Tests of Mechanical Systems shall be performed in accordance with the following Sections of the New York City Mechanical Code:

<u>Item</u>	<u>Code Section</u>
Refrigeration Systems	MC 1108

**PART 2 - PRODUCTS (NOT USED)****PART 3 - EXECUTION****3.01 INSPECTION**

- A. Examine areas and conditions under which equipment is to be installed. Do not proceed with work until conditions are suitable.

**3.02 INSTALLATION**

- A. Install equipment in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.
- B. Accessories: Install equipment accessories not installed at factory and shown on the Drawings.
- C. Connections: Connect all equipment and accessories as recommended by manufacturer for a complete installation.
- D. Contractor shall not leave sharp exposed metal edges (bottom of threaded rods, mechanical equipment supports, etc.) that could otherwise present safety hazards to the building's occupants/work staff.

**3.03 START-UP AND DEMONSTRATION/TRAINING/SERVICE**

- A. Start-Up and Demonstration/Training: The Contractor shall start-up and demonstrate in the presence of the Authority's Representative and required Department of Education personnel, including DOE Maintenance Representative, the proper operation of all equipment provided in this Contract. The Contractor shall perform necessary Interdisciplinary Tests and Functional Performance Tests (FPT) as listed in each technical Specification Section required by the Contract. The Contractor shall also provide training to the Authority's and DOE's designated Representatives. Refer to Section S01650 and the respective Technical Sections.
- B. Service: Provide the services of a competent field service representative to furnish service to the facility during construction and during the warranty period. Service must be performed within 48 hours from the time of notification (24 hours for emergencies).

**3.04 ADJUSTING AND CLEANING**

- A. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

**3.05 SPARE PARTS**

- A. Provide a set of spare parts that may be normally required, such as belts, filters, etc. that match

products installed and that are packaged with protective covering for storage and identified with labels describing contents.

**3.06 TESTING**

A. The Contractor shall furnish energy, fuel, oil, water, air, light and electrical instruments as required for all testing. Reference Section 15992, Cleaning and Testing.

**END OF SECTION**

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Piping Diagram:	_____	_____
Painting Schedule:	_____	_____

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